

IN THE CLAIMS:

This listing of claims will replace all prior versions and listings of the claims in the application:

1-27. (Cancelled)

28. (Previously presented) An antenna device having ultra wide bandwidth (UWB) characteristics, comprising:

a ground element having a cutout section with an inner circumference, the inner circumference having a first shape; and
a driven element with an outer circumference having a second shape, the driven element being smaller in size than the cutout section and being situated within the cutout section to define a clearance area between the driven element and the ground element,

wherein the first shape is a first simple closed curve having no cusps, including a plurality of first concave portions and a plurality of first convex portions,

wherein the second shape is a second simple closed curve having no cusps, including a plurality of second concave portions and a plurality of second convex portions,

wherein the first and second shapes are formed such that any radial line from the center point of the driven element will intersect the first shape at a single first intersection point, and will intersect the second shape at a single second intersection point, a distance on the radial line between the first and second intersection points being defined as a clearance width between the driven element and the ground element for the radial line, and

wherein the clearance area is tapered such that a clearance width between the driven element and the ground element is monotonically nondecreasing from a minimum clearance width to a maximum clearance width.

29. (New) An antenna device, as recited in claim 28, further comprising a transmission line for providing an electrical signal to the driven element.

30. (New) An antenna device, as recited in claim 29, wherein the transmission line is connected to a driven element at a feed point proximate to the minimum clearance width of the clearance area.

31. (New) An antenna device, as recited in claim 29, wherein the transmission line comprises a metal layer.

32. (New) An antenna device, as recited in claim 29, wherein the transmission line comprises a magnet wire.

33. (New) An antenna device, as recited in claim 29, wherein the transmission line comprises a coaxial cable.

34. (New) An antenna device, as recited in claim 29, wherein the transmission line is not coplanar with either the driven element or the ground element.

35. (New) An antenna device, as recited in claim 28, wherein the clearance area is filled with one of FR-4, Teflon, fiberglass, or air.

36 (New) An antenna device, as recited in claim 28, wherein the ground element and the driven element comprise a conductive material.

37. (New) An antenna device, as recited in claim 36, wherein the conductive material is copper.

38. (New) An antenna device, as recited in claim 28, wherein the first and second shapes are the same, except in different scale.

39. (New) An antenna device, as recited in claim 28, wherein the driven element has an axis of symmetry about a line that passes between the minimum clearance width of the clearance area and the maximum clearance width of the clearance area.